## REMARKS CONCERNING THE AMENDMENTS

The above amendments were made in an effort to more clearly define the invention. The term "first" is used to modify the polymer to designate which of the polymers must meet this requirement. As the limitation in original claim 15 applied to the then only polymer recited in claim 11, the term must still apply to that polymer, the first polymer surface-treating the pigment.

**ISSUES IN THE OFFICE ACTION**

1. Claim 15 has been rejected under 35 USC 112, second paragraph as ambiguous with respect to the antecedent basis for the term "polymer."

2. Claims 1, 3-5, 11-14 and 16 have been rejected under 35 USC 103(a) as unpatentable over Uytterhoeven et al. (US Patent No. 4,663,265) in view of Baker et al. (US Patent No. 5,698,616).

## ARGUMENTS OF APPLICANTS

Preliminary Remarks

A brief description of the present invention is thought to be desirable to establish a uniform background for identifying those features of the present invention distinguishing the claimed invention from the prior art.

It was found by Applicants that the stability and performance of liquid electrophotographic toners or inks could be substantially improved. The basis of the problem solved by Applicants was that the toner particles in the ink were unstable and would not form images with maximum possible image densities. The invention found that a pre-treatment of the colorant particles with a first coating resin having a specific range of properties, and then the dispersion of those treated particles in an organosol with a second resin with a different set of properties enhanced the performance of the liquid inks in the electrophotographic process. The important aspect of the invention is the fact that a first resin coats the colorant particles and then the coated particles are dispersed in an organosol with a second and different resin. The use of two resins, one as a particle coating and the other as the organosol binder, and their specific difference in properties act in concert to provide the benefits of the invention. Without the specific differences in properties and their combination with the specific properties associated uniquely with the colorant coating and the organosol binder, the benefits of the invention will not be obtained.

To identify these features, the limitations in amended claim 1 will be pointed out:

1. (PREVIOUSLY AMENDED) A process of making a liquid ink comprising the steps of:

(a) dissolving a first polymer comprising units derived from at least a nitrogen-containing polymerizable monomer in a solvent with a Kauri-Butanol number greater than 30 to form a polymer solution, wherein said nitrogen atom is present in a functional group selected from the group consisting of amine groups;

(b) dispersing colorant pigment particles in said polymer solution to form a colorant pigment dispersion;

(d) removing at least some of said solvent from said colorant pigment dispersion to form treated colorant pigment particles with an outer layer of the first polymer; and

(d) dispersing said treated colorant pigment particles in an organosol containing a second polymer carried in a carrier liquid having a Kauri-Butanol number less than 30.

Note that as originally filed and claimed, and as merely emphasized by the amendment (substantively limiting the claim only with respect to the fact that the first polymer treatment is a coating), the first polymer is insoluble in the carrier liquid but soluble in liquids having a Kauri-Butanol number greater than 30). This pigment surface treating polymer comprises units derived from at least a nitrogen-containing polymerizable monomer, wherein said nitrogen atom is present in a functional group selected from an amine group (e.g., consisting of primary, secondary, tertiary and quaternary amine groups). The second polymer, contained in the organosol, is dispersed or suspended in the carrier liquid, which has a Kauri-Butanol number less than 30. This combination of properties in the specific order and location recited is the feature that is absent from the teachings in some references used in the rejections as specifically pointed out in the discussion of the rejections.

## RESPONSE TO THE REJECTIONS

1. Claim 15 was rejected under 35 USC 112, second paragraph, as indefinite with respect to the antecedent basis for "the polymer."

Claim 15 has been amended to correct this deficiency. The rejection has been overcome by the amendment.

2. Claims 1-5, 11-14 and 16 have been rejected under 35 USC 103(a) as unpatentable over Uytterhoeven et al. (US Patent No. 4,663,265) in view of Baker et al. (US Patent No. 5,698,616).

The rejection of these claims is traversed. The Office Action has asserted that Uytterhoeven does not disclose reacting polymers, and does not require the reaction of the materials. **THAT ASSERTION IN THE REJECTION IS CLEARLY IN ERROR.** The basic problem with this rejection is the unique requirement of Uytterhoeven that the two polymeric materials are "chemically reacted" (column 10, lines 5-20 and 33-38). How can the language "reacted polymers A and B" not disclose and require reaction of the diverse materials. Look for example at step 3 of Examples 4, 14 and 15 of Uytterhoeven:

> "Step (3): 4.4 g of the copolymer of stearyl methacrylate and dimethylaminoethyl methacrylate (polymer B) prepared according to preparation 2 were dissolved in 500 ml of isododecane. To the obtained solution of polymer B the above prepared dispersion containing said polymer A was added portionwise in a high speed mixer and ultrasound was used intermittently over a period of 30 minutes. **After the addition the mixture was stirred for still 30 minutes to have the reaction of polymer A with polymer B completed**." (Example 4 of Uytterhoeven, Emphasis added)

> "In step (3) a polymer B was used prepared according to preparation 4. 5.64 g of polymer B were dissolved in 500 ml of isododecane and **allowed to react with polymer A** forming a pre-coating on the carbon black particles." (Example 14 of Uytterhoeven, Emphasis added)

"Step (3): 12 g of the copolymer of stearyl methacrylate and dimethylaminoethyl methacrylate (polymer B) prepared according to preparation 2 were dissolved in 500 ml of isododecane. To the obtained solution containing polymer B the above prepared dispersion containing said polymer A was added portionwise in a high speed mixer and ultrasound was used intermittently over a period of 30 minutes. After the addition the mixture was stirred for another hour at 80°C. **to have the reaction of polymer A with polymer B practically completed**." (Emphasis added)

It is therefore absolutely clear that Uytterhoeven discloses, teaches and requires the reaction of polymers A and B in the practice of that invention.

In the present invention, there is no requirement or teaching that the nitrogen-containing polymer used to treat the pigment surface be chemically reacted with the second polymer contained in the organosol. Indeed, because the present invention involves treating the surface of the pigment with a nitrogen-containing polymer dissolved in a solvent having a Kauri-Butanol number > 30 (e.g. carrier liquid insoluble) in a first step, and then combining this treated pigment with a second polymer dispersed in a carrier liquid having a Kauri-Butanol number < 30 in a second step, there is no practical way in the present invention to chemically react the two distinct polymers, which have mutually incompatible carrier solvents. Furthermore, the claim recites dispersing the coated polymer in an organosol with the second polymer therein. This excludes reacting a second polymer with a first polymer and pigment. To be dispersed excludes the reaction of the two polymers into a single chemical component.

Moreover, whereas Baker et al. teach a copolymer used to disperse a pigment in a carrier liquid, the copolymer of Baker et al. is itself a graft copolymer formed by chemically reacting a polymer (graft stabilizer) soluble in the carrier liquid (i.e. Kauri-Butanol number < 30) with a monomer (which may be derived from amino-functional groups) which polymerizes to form a carrier liquid insoluble core (i.e. soluble in a liquid with Kauri-Butanol number > 30). This graft copolymer is dispersed in the carrier liquid and combined with a pigment to

produce a liquid toner. However, this polymer, formed by chemically reacting the graft stabilizer and the core, is not itself soluble in liquids having a Kauri-Butanol number > 30, and would thus be unsuitable for the treatment of pigments as described in the present invention. It is therefore impossible to assert that it is obvious to combine the two references without destroying the function of the Uytterhoeven composition to make the coated pigment particles as taught by the present invention and as recited in the claims.

In addition, because the Baker et al. inherently teaches improvements in the sedimentation and aggregation stability of pigments by combining the pigment with an organosol, and Uytterhoeven et al. is directed at itself improving the dispersability and aggregation stability of pigment dispersions in aliphatic carrier liquids, the motivation to combine the Uytterhoeven and Baker et al. references does not exist. Either reference alone teaches an adequate and independent basis for stabilizing the pigment dispersion with respect to aggregation and sedimentation in aliphatic carrier liquids. Attempting to combine the two techniques, because of the above-identified solvent differences, would be difficult. The rejection is in error and must be withdrawn.

The rejection is clearly insufficient and must be withdrawn.

## CONCLUSION

All rejections have been overcome by amendment and/or argument, or were in error as originally stated. All claims are now in condition for allowance.

Respectfully submitted,

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I hereby certify that this paper is being transmitted by facsimile to the United States Patent and Trademark Office on the date shown below.

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15 March 2004
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